



Software Project Management – A frame work on distribution

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ABSTRACT

The purpose of this paper is to provide an extended overview of many important issues about SPM framework on distribution around which such knowledge should be structured. The introductory section merely introduces the issues and the context within which the other sections discuss them. Each of the remaining sections covers one of the issues in more detail. The idea has been to provide a balanced coverage of the issues on software project management related to distribution framework.

Keywords :

Introduction

The reason for distributing software development can be to improve time-to-market by round the-clock development or to increase flexibility in capitalizing on merger and acquisition opportunities (Herbsleb & Moitra 2001). Other reasons include access to cheaper labor (Nicholson & Sahay 2004), increasing knowledge of customers and local conditions by market proximity, or capitalizing on the global talent pool (Conchúir et al. 2009; Damian & Moitra 2006; Herbsleb & Moitra 2001). In fact, shortage of high skilled science and engineering talent and, more generally, needs for access to qualified personnel are important explanatory factors for off-shoring innovation decisions (Lewin et al. 2008; Manning et al. 2008). In line with these trends, distributed software development is now no longer only an option for most enterprises; rather, it is a business necessity (Damian et al. 2008).

The practice of geographically distributed collaborators in projects or organizations has been described by many different conceptualizations. While each conceptualization suggests different focus areas, the underlying observations of distributed collaborators are often similar.

Virtual Teams

Indicated by several literature studies in different research fields, virtual teams is a widespread and frequently used conceptualization (Curseu et al. 2008; Gillam & Oppenheim 2006; Hertel et al. 2005; Kirkman & Mathieu 2005; Martins et al. 2004; Powell et al. 2004; Schiller & Mandviwalla 2007). However, as the literature on virtual teams has grown, many different definitions have appeared. The foundation for the majority of definitions is the notion that virtual teams are functioning teams that rely on technology-mediated communication while crossing several different boundaries (Martins et al. 2004). Commonly noted boundaries are geographic, time, and organizational dispersion, while additional characteristics are electronic dependence, structural dynamism, and national diversity (Gibson & Gibbs 2006; Martins et al. 2004; Powell et al. 2004).

Project:

In assigning projects for virtual teams, task demands with a longer duration and a moderate level of interdependence contribute to a greater level of team effectiveness. Short-term projects should rely on a higher level of independence. Over the longer term however, projects that build upon interdependence will contribute toward developing work norms and help build a collective identity (Webster and Staples, 2006). Task roles that are specifically defined contribute to each

member's understanding of their place within a project and help in successfully completing within expectations (Warkentin and Beranek, 1999) Ambiguity in team tasks, on the other hand, has led to an increase in time to complete projects.

It should also be noted however that task ambiguity could also contribute to an improved, more focused team goal (Martins et al, 2004) as a team works together toward minimizing the ambiguity.

Technology:

Mentioned earlier under individual inputs, the technology adoption model seeks to explain the attitude that users have in applying new technology. We mention it here again to emphasize the importance of assigning technology to individuals that they first believe will be easy to use, and second that they believe will actually contribute to successfully completing a task (Walczuch et al, 2007). As Thomas et al (2007) discovered convincing virtual teams to use new forms of technology is an ongoing challenge. Furthermore, technology that increases the ease of communication between team members will contribute to a tighter coupling of the team and ultimately team effectiveness (Webster and Staples, 2006).

Processes

Processes represent the ongoing interaction between group members. It refers to the interdependent actions carried out by members, which transforms inputs to outputs.

Individual:

A significant contributor to effective virtual team processes, both at the individual and at the team level is communication. This was seen repeatedly through all articles that we reviewed. Trust building activities such as open communication, honesty in behaviour and delivering upon commitments contributes to team effectiveness via increased performance, job satisfaction, and decreased job stress (Staples 2001). Affect based trust (the emotional bonds between two parties that display genuine concern for each other) can assist in building team member loyalty, however greater effectiveness is found when managers focus upon cognition-based trust (demonstrated responsibility and competence) in virtual teams (Staples, 2001). Team members that show a level of dependence upon other members (i.e., requiring the support of others) will contribute to the degree of interdependence within a team. In turn, interdependence contributes to team trust, loyalty and cohesiveness. As well, individuals that seek information contribute to the coupling of the team and virtual team effectiveness (Ortiz de Guinea et al, 2005).

Team:

Team cohesion has been found to have significant relationships with job quality, satisfaction, and trust (Ortiz de Guinea et al, 2005). Virtual teams with similar work attitudes have a higher degree of cohesion. Good communication practices, such as frequent and spontaneous (Gibson and Gibbs, 2006) as well as support for full team communication (Polzer et al, 2006) have also been found to contribute to overall virtual team effectiveness. Virtual teams that have a history of high productivity communicate more often on an informal, more social basis. Furthermore, relationship building by enhanced social communication, or facilitating regular chat sessions with all team members leads toward greater satisfaction of individual team members and better team performance (Powell et al, 2004).

Leader:

Virtual team leaders should take time to assess the needs of the team and its individual members, employing guidelines and rules of "netiquette" that the team can follow for the duration of the project. Such actions by the leader can build upon team satisfaction and cohesiveness (Hertel et al, 2005). While resources should be supplied to the team to carry out their task, the power to take action as well as make decisions should be with the team, independent of management influence (Staples et al, 2005). Overall goals as well as establishing direction may fit within the responsibility of the team leader, but individual members should be able to decide upon their own specific approach to accomplishing tasks. This makes sense, since members in a virtual team are dispersed over great areas, making any form of micromanagement exhausting, if not impossible (Staples et al, 2005).

Organization:

Organizations can facilitate effective virtual teams by ensuring that the teams and its members have sufficient channels to support social cues among members and leaders. Supplying teams with resources that enable more verbal and nonverbal cues transferred back and forth at a faster, as well as more frequent rate, will reduce any potential feelings of disconnectedness and isolation within the teams (Warkentin and Beranek, 1999). Hyrkkänen et al (2007) underscore the impact that breakdowns in communication tools have on successful communication in virtual environments.

The workspaces that virtual team members employ for individual work – where concentration demands are high, and virtual collaboration spaces – supporting video and teleconferencing, are requirements called upon in research to support contemporary work practices such as virtual teams (Vartiainen, 2007). Organizations can also facilitate training programs specific for virtual teams that may include conventional team development exercises (such as clarifying team goals and individual roles), but also include best practices in electronic communication and self-management (Hertel et al, 2005). It is within the role of organizations to support a kick-off workshop that not only prepares team members for work processes and challenges of virtual collaboration, but also ushers in a trust-building process, a shared context among team members, as well as team identification (Hertel et al, 2005).

A challenge for organizations is the management and transfer of knowledge among team individuals, as well as from the team to the organization. The temporal nature of virtual teams, and the reduced amount of face-to-face communication leads to complexity in transfer of extant, as well as new knowledge generated due to individual collaboration.

However, organizations have the advantage of establishing system-wide modifications to capture knowledge as it is

transferred via supportive communication channels (Hertel et al, 2005), which aids in documenting the progress of virtual teams, and contributes to subsequent virtual teams, and their effectiveness.

Outputs

Virtual team outputs refer to the consequences of a group's collaboration as they relate to task and non-task items.

Off shore outsourcing

The offshore outsourcing conceptualization suggests a particular emphasis on cross organizational transactions, by the term "outsourcing". The term "outsourcing" reflects the use of external agents to perform one or more organizational activities (e.g., purchasing of a good or service) (Dibbern et al. 2004). This can apply to everything from the use of contract programmers to third-party facilities management. Additionally, the term "offshore" emphasizes a crossing of national borders. The term "offshore" furthermore reflects outsourcing to countries other than those that have traditionally dominated the software development industry (Smith et al. 1996). Offshore outsourcing arrangements can include a virtual team setting, but it is only one of many approaches (Dibbern et al. 2004). Some offshore outsourcing cases pursue high levels of interdependency and integration, which is compliant with virtual teams, while others go in opposite directions (Dibbern et al. 2004; Kaiser & Hawk 2004).

Software development

Software has become a vital component of almost every business. Success increasingly depends on using software as a competitive advantage (Carmel 1999). More than a decade ago, many organizations seeking lower costs and access to skilled resources began to experiment with remotely located software development facilities. Economic forces are relentlessly turning national markets into global markets and spawning new forms of competition and cooperation that reach across national boundaries.

Several factors have contributed to build this scenario (Herbsleb and Moitra 2001) such as: – the business market proximity advantages, including knowledge of customers and local conditions; – pressure to improve time-to-market by using time-zone differences in 'round-the-clock' development; – the need to have a global resource pool to successfully and cost-competitively have resources, wherever located.

Global Software Development (GSD)

The software process is defined by a set of activities, methods, practices and technologies that people and companies use to develop and to keep related software and products (Pressman 2001). The interest in the software process is based on the following premises:

- The software quality is strongly dependent on the quality of the process used in its preparation;
- The software process can be defined, managed, measured, and improved.

It is not a simple task to develop software, even when using a well-defined development process.

Other global software development research focuses on going beyond communication technologies by reducing intensive collaboration (Carmel & Agarwal 2001). This approach is also suggested in the offshore outsourcing and virtual organization research. However, in general, "global software development" does not appear as established or clearly defined a concept as "virtual teams", "offshore outsourcing", and "virtual organizations".

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